Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 (Currently amended): A method of ~~detecting a signal indicative of a property of a structure in~~ evaluating a semiconductor wafer, the method comprising:

receiving a semiconductor wafer that comprises ~~a test structure, wherein the test structure comprises a first and second region that differ from each other by at least one property and wherein the first region comprises an interface in the wafer~~ a first region and an second region, the first region comprising a plurality of dopants;

oscillating a spot of coherent electromagnetic radiation between the first region and the second region;

wherein the coherent electromagnetic radiation is substantially of a wavelength predetermined to ensure that a penetration depth of the coherent electromagnetic radiation in the first region is between [[a]] (a) depth of ~~the~~ an interface between the first region and a well underneath the first region and [[a]] (b) thickness of the wafer; [[and]]

using a photodetector to measure intensity of a portion of the electromagnetic radiation reflected during said oscillating; and

synchronously detecting, at a frequency of said oscillating, an amplitude of an electrical signal generated by the photodetector during measurement by the photodetector.

2 (Currently amended): ~~The method of Claim 1 further comprising:~~

A method of evaluating a semiconductor wafer, the method comprising:

receiving a semiconductor wafer comprising a first region and a second region that differ from each other by at least one property and wherein the first region comprises an interface in the wafer;

oscillating a spot of coherent electromagnetic radiation between the first region and the second region;

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd
Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 7/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

measuring intensity of a portion of the electromagnetic radiation reflected during said oscillating;

synchronously detecting, at a frequency of said oscillating, an amplitude of an electrical signal generated during said measuring; and

repeating said acts of (oscillating, ~~using photodetector~~ measuring and synchronously detecting) with electromagnetic radiation of another wavelength.

3 (Currently amended): The method of Claim 1 wherein ~~the first region comprises a plurality of dopants, and~~ said amplitude is indicative of a property [[is]] selected from a group consisting of: depth of an interface between the first region and a well in which the first region is formed, abruptness of a profile of the dopants, and a peak in the dopant profile.

4 (Original): The method of Claim 1 further comprising:

changing at least one process parameter used in fabricating the wafer if said amplitude falls outside a predetermined range.

Claim 5 (canceled).

6 (Currently amended): ~~The method of Claim 5 further comprises~~

A method of evaluating a semiconductor wafer, the method comprising:

receiving a semiconductor wafer that comprises a test structure, the test structure comprising a first region and a second region that differ from each other by at least one property;

oscillating a spot of coherent electromagnetic radiation between the first region and the second region;

measuring intensity of a portion of the electromagnetic radiation reflected during said oscillating;

synchronously detecting, at a frequency of said oscillating, an amplitude of an electrical signal generated during said measuring; and

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 8/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

performing a look-up of a table of predetermined data with said amplitude as input to determine thickness of ~~the first~~ a layer in the semiconductor wafer.

7 (Currently amended): ~~The method of Claim 1~~

A method of evaluating a semiconductor wafer, the method comprising:

receiving a semiconductor wafer comprising a first region and a second region that differ from each other by at least one property;

oscillating a spot of coherent electromagnetic radiation between the first region and the second region;

measuring intensity of a portion of the electromagnetic radiation reflected during said oscillating; and

synchronously detecting, at a frequency of said oscillating, an amplitude of an electrical signal generated during said measuring;

wherein only one of the first region and second region is a doped region and the method further comprises performing a look-up of a table of predetermined data with said amplitude as input to determine a property of the doped region.

8 (Original): The method of Claim 7 where said property is selected from the group consisting of:

depth of an annealed semiconductor junction;

a dose of implants in said doped region before annealing;

a dose of implants in said doped region after annealing;

a doping concentration after annealing;

abruptness of a profile of doping concentration after annealing; and

a defect density inside the doped region after annealing.

9 (Original): The method of Claim 1 wherein:

said synchronously detecting is performed in a lock-in amplifier coupled to said photodetector to receive therefrom said electrical signal, said lock-in amplifier being tuned to the predetermined frequency f; and

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd. Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 9/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

said lock-in amplifier detecting said amplitude of fluctuation of said electrical signal.

10 (Original): The method of Claim 1 where at least one of said beam and said wafer is kept stationary relative to ground.

11 (Original): The method of Claim 1 where a source of said beam and the wafer are both kept stationary relative to ground, and the method further comprises:

using a beam deflector to move the beam relative to the wafer.

12 (Currently amended): ~~The method of Claim 1 wherein:~~

A method of evaluating a semiconductor wafer, the method comprising:

receiving a semiconductor wafer comprising a first region and a second region that differ from each other by at least one property;

oscillating a spot of coherent electromagnetic radiation between the first region and the second region;

measuring intensity of a portion of the electromagnetic radiation reflected during said oscillating; and

synchronously detecting, at a frequency of said oscillating, an amplitude of an electrical signal generated during said measuring;

wherein the absorption length of the beam in the wafer is less than one-half of the thickness of the wafer.

13 (Original): The method of Claim 1 wherein:

said first region and said second region touch each other at a common boundary.

14 (Original): The method of Claim 1 wherein:

said first region and said second region are separated from each other.

15 (Original): The method of Claim 1 wherein:

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd
Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 10/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

said coherent electromagnetic radiation is substantially of a predetermined wavelength.

16 (Currently amended): ~~The method of Claim 1 wherein:~~

A method of evaluating a semiconductor wafer, the method comprising:

receiving a semiconductor wafer comprising a doped region and another region that differ from each other by at least one property;

oscillating a spot of coherent electromagnetic radiation between said doped region and said another region;

measuring intensity of a portion of the electromagnetic radiation reflected during said oscillating; and

synchronously detecting, at a frequency of said oscillating, an amplitude of an electrical signal generated during said measuring;

wherein said spot is formed on a first surface at which [[a]] said doped region is located in said wafer.

17 (Original): The method of Claim 1 wherein:

said spot is formed continuously on said wafer.

18 (Original): The method of Claim 1 wherein:

said spot is oscillated along a straight line.

19 (Currently amended): The method of Claim [[1]] 6 wherein:

said wafer comprises at least a portion of an integrated circuit, said integrated circuit being in addition to said test structure also comprised in said wafer;

each of the first region and the second region in the test structure have area sufficiently large to accommodate a diameter of said spot; and

dimensions of regions of transistors of said integrated circuit are much finer than said diameter.

SILICON VALLEY
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2350 Mission College Blvd
Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

20 (Currently amended): The method of Claim 19 further comprising: forming said portion of integrated circuit and test structure using at least one common process step.

21 (Currently amended): A method of ~~detecting a signal indicative of a property of a structure in~~ evaluating a semiconductor wafer, the method comprising:

receiving a semiconductor wafer that comprises a test structure, wherein the test structure comprises a first and second region that differ from each other by at least one property and wherein the first region comprises an interface in the wafer;

oscillating a first spot and a second spot that at least partially overlaps the first spot between the first region and the second region;

wherein the first spot is formed by a first beam of coherent electromagnetic radiation that has a first penetration depth between a depth of the interface and a thickness of the wafer, wherein the second spot is formed by a second beam of coherent electromagnetic radiation, wherein the first beam has photon energy lower than a semiconductor bandgap energy and the second beam has photon energy greater than the semiconductor bandgap energy;

using a photodetector to measure intensity of a portion of the first beam reflected during said oscillating; and

synchronously detecting, at a frequency of said oscillating, an amplitude of an electrical signal generated by the photodetector during measurement by the photodetector.

22 (Original): The method of Claim 21 wherein the first beam and the second beam are coaxial, and the first spot and the second spot are concentric.

23 (Currently amended): The method of Claim 21 wherein the wavelength of the second beam is [[also]] sufficiently short to ensure that an absorption length of the second beam in the wafer is less than a thickness of the wafer but greater than a profile of a depth in the wafer.

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 12/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

24 (Original): The method of Claim 21 further comprising:

changing a process parameter used in fabricating the wafer if said amplitude falls outside a predetermined range.

25 (Original): The method of Claim 21 where a first source of said first beam, a second source of said second beam and the wafer are all kept stationary relative to ground, and the method further comprises:

using a beam deflector to move the first beam and the second beam relative to the wafer.

26 (Original): The method of Claim 21 wherein:

wavelengths of the first beam and of the second beam are each sufficiently short to ensure their respective absorption lengths are lower than one-half of the thickness of the wafer.

27 (Currently amended): An apparatus for evaluating a semiconductor wafer, the apparatus comprising a patterning tool, an ion implanter located adjacent to the patterning tool, and a measurement tool adjacent to the ion implanter, the measurement tool comprising:

a source of a beam of coherent electromagnetic radiation [[of]] substantially of a wavelength predetermined to ensure that absorption length in the wafer is less than a thickness of the wafer but greater than a depth of ~~an interface~~ a pn junction in the wafer;

means for moving at least one of the beam and a stage carrying the wafer relative to one another to oscillate a spot formed by the beam between a first region and a second region of the wafer, the first region comprising a plurality of dopants; and

a photodetector located in a path of reflection of the beam from the wafer;

wherein the ion implanter receives a feedback signal, based on a measurement signal generated by the measurement tool.

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd
Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

28 (Original): The apparatus of Claim 27 wherein:

PAGE 13/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

the source of said coherent beam of electromagnetic radiation is a laser.

29 (Original): The apparatus of Claim 27 wherein:

the means for moving comprises an acousto-optic deflector located in a path of the beam.

30 (Original): The apparatus of Claim 27 wherein:

the means for moving comprises a scanning galvanometer mirror located in a path of the beam.

31 (Original): The apparatus of Claim 27 wherein:

the means for moving comprises a piezoelectric actuator attached to the stage.

32 (Currently amended): ~~The apparatus of Claim 27 further comprising:~~

An apparatus for evaluating a semiconductor wafer, the apparatus comprising a patterning tool, an ion implanter located adjacent to the patterning tool, and a measurement tool adjacent to the ion implanter, the measurement tool comprising:

a source of a beam of coherent electromagnetic radiation of absorption length less than a thickness of the wafer but greater than a depth of an interface in the wafer;

means for moving at least one of the beam and a stage carrying the wafer relative to one another to oscillate a spot formed by the beam between a first region and a second region of the wafer;

a photodetector located in a path of reflection of the beam from the wafer;

a plurality of additional lasers mounted adjacent to one another at a plurality of positions located along a first line, and said source is mounted adjacent to one of the additional lasers and along the first line;

at least one mirror attached to means for translation along a second line parallel to the first line, and between a plurality of corresponding locations opposite to the plurality of positions of the lasers and said source;

a stage for supporting the wafer, with a front surface of the wafer facing the beam from the mirror at normal incidence thereof;

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 14/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/8 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

wherein the means for moving comprises an optical element located along the second line, In a path of the beam reflected by the mirror; and

the apparatus further comprises a beam splitter located along the second line, between the means for moving and the mirror.

33 (Currently amended): The apparatus of Claim [[27]] 32 further comprising:

a second mirror mounted along the second line, opposite to the means for moving;

an objective lens located between the second mirror and the wafer;

an optical bench having a planar surface;

wherein said source, said means, said photodetector, said additional lasers and said mirrors are mounted on the planar surface of the optical bench and the wafer is mounted on the stage in a plane parallel to the planar surface of the optical bench.

34 (Original): The apparatus of Claim 27 further comprising:

a synchronous detector coupled to the photodetector to receive a first electrical signal generated by the photodetector, the synchronous detector being further coupled to said means by a cable carrying a predetermined frequency of oscillation of said spot by said means, the synchronous detector measuring an amplitude of a portion of the first electrical signal fluctuating at the predetermined frequency and in phase with movement by said means.

35 (Currently amended): The apparatus of Claim [[27]] 32 further comprising:

another laser mounted along the second line, opposite to the mirror.

36 (New): The apparatus of Claim 27 further comprising:

a factory computer coupled to the measurement tool to receive the measurement signal therefrom;

wherein the factory computer is further coupled to the ion implanter to supply the feedback signal thereto.

SILICON VALLEY PATENT GROUP LLP
2350 Mission College Blvd
Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 15/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18

37 (New): The method of Claim 1 wherein:

the semiconductor wafer has a continuous planar surface in said first region and said second region; and

during the oscillating, the spot is moved across the continuous planar surface.

38 (New): The method of Claim 2 wherein:

the semiconductor wafer has a continuous planar surface in said first region and said second region; and

during the oscillating, the spot is moved across the continuous planar surface.

39 (New): The method of Claim 6 wherein:

the semiconductor wafer has a continuous planar surface in said first region and said second region; and

during the oscillating, the spot is moved across the continuous planar surface.

40 (New): The method of Claim 7 wherein:

the semiconductor wafer has a continuous planar surface in said first region and said second region; and

during the oscillating, the spot is moved across the continuous planar surface.

41 (New): The method of Claim 12 wherein:

the semiconductor wafer has a continuous planar surface in said first region and said second region; and

during the oscillating, the spot is moved across the continuous planar surface.

SILICON VALLEY
PATENT GROUP LLP
2350 Mission College Blvd
Suite 360
Santa Clara, CA 95054
(408) 982-8200
FAX (408) 982-8210

PAGE 16/20 * RCVD AT 8/16/2006 11:27:13 PM [Eastern Daylight Time] * SVR:USPTO-EFXRF-2/6 * DNIS:2738300 * CSID:408 982 8210 * DURATION (mm-ss):09-18